University of Gdańsk

Subject card

Subject name and code	Biochemistry of proteins , PG_00198165		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	4.0
Learning profile	academic	Assessment form	credit
Conducting unit	UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Marta Zimna	
	Teachers	dr Marta Zimna dr Gabriela Brzuska dr Alicja Chmielewska	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	60.0	0.0	0.0	60
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	60	10.0	30.0	100

Subject objectives	Conveying in-depth knowledge of techniques used for work with proteins, also at the molecular level (properties of proteins and their interactions, chromatographic purification, electrophoretic analysis, quantitative determination and immunodetection of proteins). Acquiring in-depth knowledge of the principles of health and safety in a biotechnology laboratory, including work with biological agents and GMM. Acquiring the ability to document activities and results; operate laboratory equipment, teamwork, collecting and interpreting data and making conclusions, including statistical analysis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_U01] The graduate possesses the skills necessary to design and conduct laboratory research, critically assessing risks, method limitations, and ethical implications of undertaken activities.	The student possesses in-depth laboratory skills in working with proteins, including the use of appropriate research equipment; from the planning stage of the experiment, through its execution while applying suitable controls, to proper documentation of the work and interpretation of results. Under the guidance of a supervisor, they apply more complex techniques (sonification, chemiluminescence detection, ultrafiltration). The student works in accordance with health and safety regulations and understands the hazards associated with laboratory work.	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[BIOTECHMU2_W06] The graduate has in-depth knowledge and understands the risks associated with conducting laboratory works, including those resulting from working with infectious material, GMOs and GMMs.	The student is able to conduct laboratory research responsibly and in accordance with legal regulations using infectious materials, GMOs, and GMMs.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[BIOTECHMU2_W01] The graduate has in-depth knowledge of complex biological phenomena at the molecular level and knows their importance for biotechnology, is able to analyze them in an interdisciplinary approach and assess their ethical, social and environmental implications.	The student has an integrated understanding of how to carry out a project on the overexpression of a recombinant gene in a bacterial system, obtaining a protein preparation and being able to analyze it.	[SW2] presentation/project/paper/ report [SW3] text preparation/written work
[BIOTECHMU2_U03] The graduate is able to work independently and in a team, including acting as a leader, demonstrating social maturity, empathy and responsibility for the team and the decisions made.	The student is capable of working independently and in a small (2-3 person) team during laboratory activities and the preparation of the final report, effectively dividing tasks.	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work

Subject contents

The content of the laboratory exercises includes in-depth knowledge of techniques used in work with proteins. The principles of safety and hygiene in a biotechnology laboratory will also be presented, as well as the hazards associated with conducting laboratory research, including risks related to working with pathogenic organisms and GMOs/GMMs. Students will conduct exercises in teams of 2-3 people using the following techniques: isolation of proteins from natural sources (e.g., egg white) or recombinant sources (*E. coli* expression system); protein purification using various chromatographic methods; and detection and analysis of proteins (SDS-PAGE, Western blotting, ELISA).

Prerequisites and co-requisites

The completion of the course: Biochemistry (as a separate course or within other courses) is required. Knowledge of methods for calculating solution concentrations is required, which will be assessed in a written test during the first class.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Points from the Lab Evaluation Rubrics	51.0%	25.0%
Points from the final test	51.0%	50.0%
Points from the written report	51.0%	25.0%

Recommended reading

Basic literature	Chmielewska A, Krol E, Lipinska A, Rychlowska M: "Protein Biochemistry lab - laboratory manual" (current year edition) - provided during the first classes.
Supplementary literature	Resources provided by supervisors and library/on-line resources based on topics provided during classes.
eResources addresses	

Example issues/ example questions/ tasks being completed

Open questions during the final test.

Work placement

Not applicable

Document generated electronically. Does not require a seal or signature.